U.S. Department
of Transportation

**Pipeline and
Hazardous Materials
Safety Administration**

East Building, PHH-23
1200 New Jersey Ave., SE
Washington, D.C. 20590

**COMPETENT AUTHORITY CERTIFICATION
FOR A TYPE B(U)F FISSILE
RADIOACTIVE MATERIALS PACKAGE DESIGN
CERTIFICATE USA/0553/B(U)F-85, REVISION 3**

REVALIDATION OF CANADIAN COMPETENT AUTHORITY CERTIFICATE CDN/2061/B(U)F-85

This certifies that the radioactive materials package design described below is hereby approved for use within the United States for import and export shipments only. Shipments must be made in accordance with the applicable regulations of the International Atomic Energy Agency[1] and United States of America[2].

1. Package Identification - AECL-CRL Irradiated Material Transportation Package.

2. Package Description - as described in Canadian Certificate of Competent Authority CDN/2061/B(U)F-85, Revision 7 (attached).

3. Authorized Radioactive Contents - as described in Canadian Certificate of Competent Authority CDN/2061/B(U)F-85, Revision 7, (attached) and restricted to any one of the following:

   a. One natural uranium CANDU fuel assembly as described in Section 3.2 of the SAR, with no greater than 19.86 kg (44 pounds) of initial uranium, irradiated to no greater than 13,310 MWd/MTU (1150 GJ/kgU), and cooled for at least 180 days.

   b. Irradiated power reactor channel components as described in Section 3.3 of the SAR, or irradiated test specimens as described in Section 3.4 of the SAR, limited to 30,000 Ci total, with less than 540 Ci Cobalt-60, and shipped in either the standard package shield insert and drawer or in shield insert No. 2.

   c. Irradiated power reactor channel components as described in Section 3.3 of the SAR, or irradiated test specimens as described in Section 3.4 of the SAR, limited to the activities listed in Section 9.8.3 of the SAR, and shipped in either the standard package shield insert and drawer, in shield insert No. 2, or in shield insert No. 3.

4. Criticality Safety Index -

   a. The minimum Criticality Safety Index is 25.0. The maximum number of packages per conveyance shall be determined in accordance with Table X of the IAEA regulations cited in this certificate.

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[1] "Regulations for the Safe Transport of Radioactive Materials, 1996 Edition (Revised)", No. TS-R-1 (ST-1, Revised)," published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

[2] Title 49, Code of Federal Regulations, Parts 100 - 199, United States of America.

CERTIFICATE USA/0553/B(U)F-85, REVISION 3

5. General Conditions -

   a. Each user of this certificate must have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation. The user shall prepare the package for shipment in accordance with the documentation and applicable regulations.

   b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Hazardous Materials Technology (DHM-23), Research and Special Programs Administration, U.S. Department of Transportation, Washington, D.C. 20590-0001.

   c. This certificate does not relieve any consignor or carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.

   d. This certificate provides no relief from the limitations for transportation of plutonium by air in the United States as cited in the regulation of the U.S. Nuclear Regulatory Commission 10 CFR 71.88.

   e. Records of Quality Assurance activities required by Paragraph 209 of the IAEA regulations[1] shall be maintained and made available to authorized officials for at least three years after the last shipment authorized by this certificate. Consignors exporting shipments from the United States shall satisfy the requirements of Subpart H of 10 CFR 71.

6. Specific Conditions -

   a. Residual non-fixed radioactive material on the outside surface of the packaging when shipped empty as an "excepted" package will not exceed 4 Bq/cm2 (10-5 µCi/cm2) for beta, gamma, and low-toxicity alpha emitters and 0.4 Bq/cm2 (10-6 µCi/cm2) for all other alpha emitters.

   b. The transport index of each package shall be determined by direct measurement.

   c. Package must be transported as exclusive use.

7. Marking and Labeling - The package shall bear the marking USA/0553/B(U)F-85 in addition to other required markings and labeling.

8. Expiration Date - This certificate expires on May 31, 2014.

This certificate is issued in accordance with paragraphs 814 and 817 of the IAEA Regulations and Section 173.473 of Title 49 of the Code of Federal Regulations, in response to the May 25, 2010 petition submitted by Transport Logistics International, Fulton, MD, and in consideration of other information on file in this Office.

Certified by:

JUN -4 2010

Dr. Magdy El-Sibaie
Associate Administrator for Hazardous Materials Safety

(DATE)

Revision 3 - issued to endorse, with restricted contents and specific operational conditions, Canadian Certificate of Competent Authority No. CDN/2061/B(U)F-85, Revision 7.

Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Canadian Certificate No.	Issue Date	Expiry Date	CNSC File
CDN/2061/B(U)F-85 (Rev. 7)	**May-11-2010**	**May-31-2014**	**30-A1-159-0**

Certificate
for
Transport Package Design

The transport package design identified below is certified by the Canadian Nuclear Safety Commission pursuant to paragraph 21(1)(h) of the *Nuclear Safety and Control Act* and Section 7 of the *Packaging and Transport of Nuclear Substances Regulations*, and to the 1985 Edition (As Amended 1990) of the IAEA *Regulations for the Safe Transport of Radioactive Material.*

REGISTRATION OF USE OF PACKAGES

All users of this authorization shall register their identity in writing with the Canadian Nuclear Safety Commission prior to the first use of this authorization and shall certify that they possess the instructions necessary for preparation of the package for shipment.

PACKAGE IDENTIFICATION

Designer:	**Atomic Energy of Canada Limited**
Make/Model:	**Irradiated Material Transportation Package**
Mode of Transport:	**Sea, Road, Rail**

IDENTIFICATION MARK

The package shall bear the competent authority identification mark **"CDN/2061/B(U)F - 85"**.

PACKAGE DESCRIPTION

The AECL-CRL Irradiated Material Transportation Package, as shown on Atomic Energy of Canada Limited, Chalk River Laboratories Drawing No. A-5580-106 (Rev. 1) consists of a monolithic stainless steel forging, 760 mm in diameter by 1370 mm long, with a 320 mm diameter cavity. The package is transported in a horizontal position with impact limiters at each end and fixed to a frame by trunnions.

The cavity of the main flask body will contain any one of the following inserts at a time.

1. Shield Insert No. 1: The shield insert, as shown on Drawing No. E-5580-SA-12 (Rev. 1), consists of a stainless steel clad, lead filled insert with a square cavity running the full length. The dimensions of the insert are 1168 mm long by 320 mm outer diameter and weighs approximately 670 kg. The insert contains a stainless steel drawer with 280 mm of steel shielding at each end. The drawer is secured to the main flask body by a 25 mm cap screw. The dimensions of the drawer are 1168 mm long by 152 mm square with a cavity length of 660 mm by 143 mm square and weighs approximately 115 kg.

Canada

2. Shield Insert No. 2: The shield insert No. 2, as shown on Drawing No. E-5580-SA-16 (Rev. 1), consists of a stainless steel clad, lead filled shielding insert. At one end of the insert is a removable stainless steel clad, lead filled shield plug. The insert is secured to the main flask body by eight cap screws. The interface between the insert and flask is sealed with two O-rings. The dimensions are 1168 mm long by 320 mm outer diameter with a cavity length of 813 mm by 178 mm diameter and weighs approximately 711 kg.

3. Shield Insert No. 3: The shield insert as shown on Drawing No. E-5580-SA-18 (Rev. 2), consists of a stainless steel clad, lead filled shielding insert. At one end of the insert is a removable stainless steel clad, lead filled shield plug. The insert is secured to the main flask body by eight cap screws. The interface between the insert and flask is sealed with two O-rings. The dimensions are 1168 mm long by 320 mm outer diameter with a cavity length of 775 mm by 267 mm diameter and weighs approximately 470 kg.

The main body cavity of the package has closure flanges at each end, each secured by eight 25 mm diameter Nitronic 60 capscrews and sealed with two O-rings. Test ports are provided for leak detection.

An optional aluminum weather cover may be provided for additional protection during transport.

The overall dimensions of the package including impact limiters, but excluding the support frame and aluminum weather cover, are 1220 mm diameter by 1930 mm long. The total mass of the package is approximately 5550 kg, including support frame.

An illustration of the package is shown on attached AECL/CRL Drawing No. A-5580-106, (Rev. 1).

The configuration of the package is as follows:

Shape:	**Cylinder**	Shielding:	**Lead**
Mass:	**5550 kg**	Outer Casing:	**n/a**
Length:	**1930 mm**	Height:	**n/a**
Width:	**n/a**	Diameter:	**1220 mm**

AUTHORIZED RADIOACTIVE CONTENTS

See APPENDIX "A"

QUALITY ASSURANCE

Quality assurance for the design, manufacture, testing, documentation, use, maintenance and inspection of the package shall be in accordance with:

- AECL Document No. EPS-01913-QAM-001(Rev.0)* "Engineered Products and Services Division

Design Quality Assurance Manual"

- AECL Document No. A-13318-SP-1 (Rev. 3), "Irradiated Material Transportation Packaging Technical Specification"
- AECL Document No. A-13318-PR-4 (Rev. 7), "Irradiated Material Transportation Package Operating Procedures"
- Packaging and Transport of Nuclear Substances Regulations
- IAEA Regulations
- * or latest current revision

SHIPMENT

The preparation for shipment of the package shall be in accordance with:

- AECL Operating Procedures, Document No. A 13318-PR-4, (Rev. 7)
- Packaging and Transport of Nuclear Substances Regulations
- IAEA Regulations

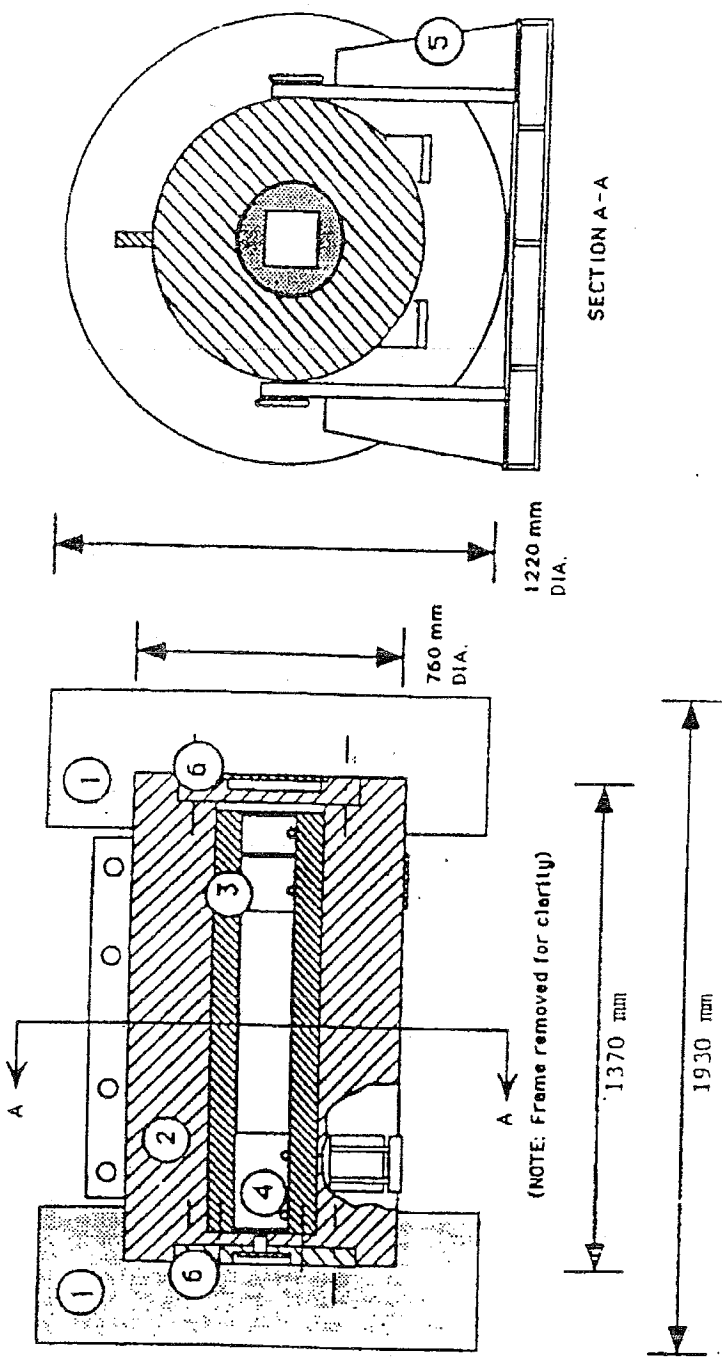
Shipment is authorized as fissile with a minimum Criticality Safety Index (CSI) 25 (fissile material only) for criticality control.

Shipment of fissile material in Appendix "A", Authorized Radioactive Contents a); shall be transported under exclusive use.

This certificate does not relieve the shipper from any requirement of the government of any country through or into which the package will be transported.

S. Faille
Designated Officer pursuant to paragraph 37(2)(a)
of the Nuclear Safety and Control Act

Canada



PACKAGE MASS: 5550 kg Including support frame
5215 kg excluding support frame

1. IMPACT LIMITER
2. MAIN FLASK BODY
3. SHIELD INSERT
4. REMOVABLE DRAWER
5. SUPPORT FRAME
6. SEALING FLANGES

THIS PACKAGE CONFORMS TO TYPE B(U) OF IAEA SAFETY SERIES NO. 6
AECB CERTIFICATE NO CDN/2061/B(U)-85

IRRADIATED MATERIAL TRANSPORTATION PACKAGING

TITLE Irradiated Material Transportation Packaging Illustration	SUBMITTED K. Gross DATE 93/08/13	DR'N R. Gross DATE 93/08/13		
	APP'D F.W. Butterworth DATE 93.8.4	CHK'D	DATE	
	CHALK RIVER NUCLEAR LABORATORIES	BLDG. No	CODE	CLASS
		N/A		
SCALE Not-to-scale	ATOMIC ENERGY OF CANADA LIMITED CHALK RIVER ONTARIO, CANADA	A-5580-106 REV NO. 01		

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APPENDIX "A"

AUTHORIZED RADIOACTIVE CONTENTS

This package is authorized to contain:

a) irradiated uranium, thorium or mixed uranium/thorium/plutonium fuel with a maximum activity of 2,000 TBq (54,000 Ci) of which not more than 20 TBq (540 Ci) shall give rise to decay gamma energies greater than 1.0 MeV consisting of:

i) one 28 element fuel bundle assembly or up to 28 such elements,

ii) one 37 element fuel bundle assembly or up to 37 such elements, or

iii) one 43 element fuel bundle assembly or up to 43 such elements, or

iv) up to 28 elements for any combination of i), ii), or iii), or

v) individual sectioned or intact fuel elements, fuel pellets, metallurgical fuel samples or powders.

Subject to the following requirements:

(i) any defective fuel bundles or defective elements shall be either canned or shipped with an inert cover gas;

(ii) individual sectioned, fuel elements, fuel pellets or powders, metallurgical fuel samples or powders shall be shipped in a closed container;

(iii) the package shall not contain fuel with more than the following initial masses of U-235:

Maximum Enrichment wt% U-235 in U or U + Th	≤ 3.5	5.0	8.0	10.0	>10.0
Permissible Mass U-235 kg	1.52	1.26	1.01	0.94	0.65

(iv) for packages containing mixed oxides of plutonium and thorium or plutonium and uranium (depleted or natural) fuel containing up to 5 wt% PuO_2 the total initial (prior to irradiation or burn-up) plutonium mass shall not exceed 0.41 kg;

(v) for packages containing a mixture of uranium fuel and/or thorium fuel and mixed oxide fuel containing plutonium, the total initial (prior to irradiation or burn-up) fissile mass shall not exceed 0.41 kg;

(vi) the neutron emission rate shall not exceed 9.2×10^6 neutrons/second;

b) irradiated power reactor channel components with a maximum activity of 3,000 A_2 or 1,100 TBq (30,000 Ci), whichever is less, typically consisting of mainly Zr-95, Nb-95, Co-60 and Cr-51; or

c) irradiated test specimens with a maximum activity of 3,000 A_2 or 1,100 TBq (30,000 Ci), whichever is less, typically consisting of zirconium, and/or hafnium.

The radioactive decay heat for contents a), b) or c) shall not exceed 160 watts.

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CERTIFICATE NUMBER: USA/0553/B(U)F-85, Revision 3

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